

Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

1.9
En 862 Wh

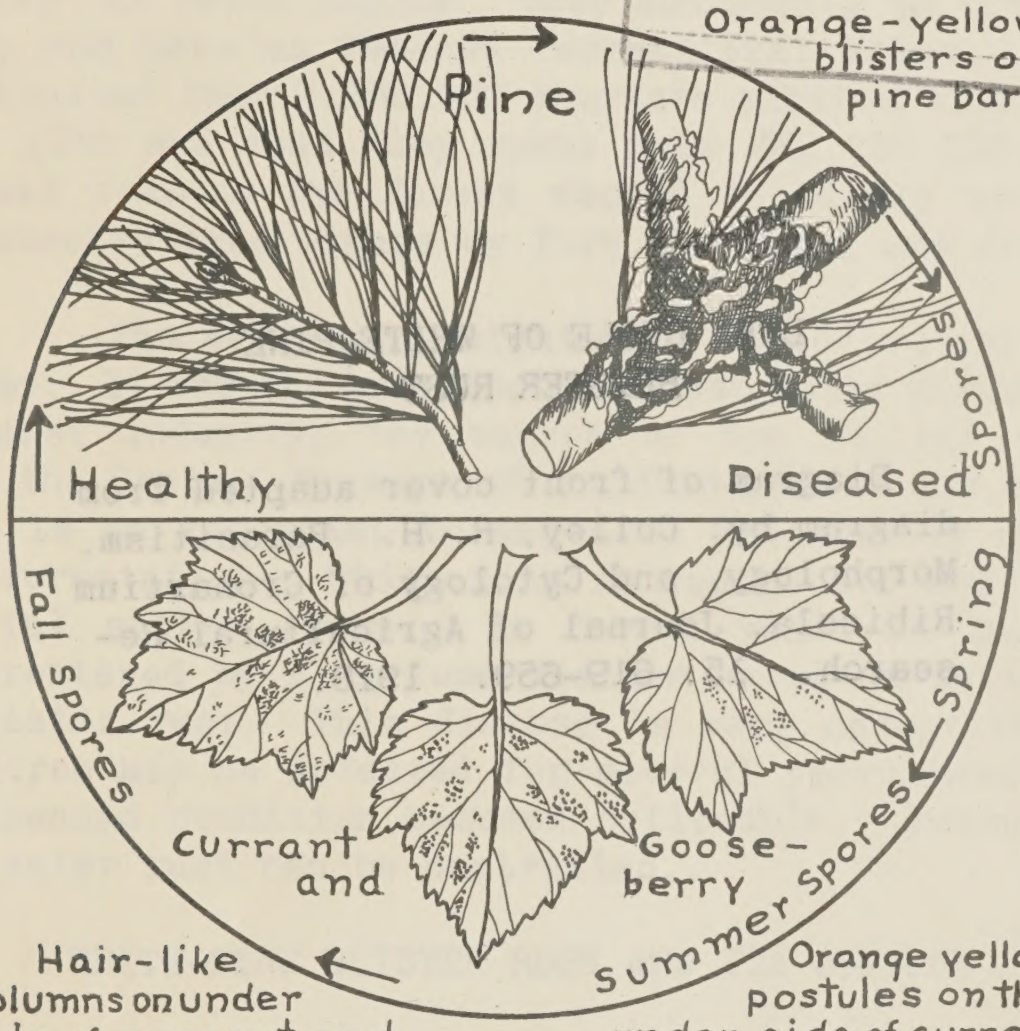
and Frank et al.

**UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE**

(and)
**MINNESOTA DEPARTMENT OF CONSERVATION
Division of Forestry**

cooperating

**LIBRARY
RECEIVED**
★ SEP 8 1936 ★
U. S. Department of Agriculture



Orange-yellow blisters on pine bark

Healthy

Diseased

Fall spores

Spring

Currant and

Gooseberry

Hair-like columns on under side of currant and gooseberry leaves.

Orange yellow postules on the under side of currant and gooseberry leaves.

WHITE-PINE BLISTER-RUST CONTROL

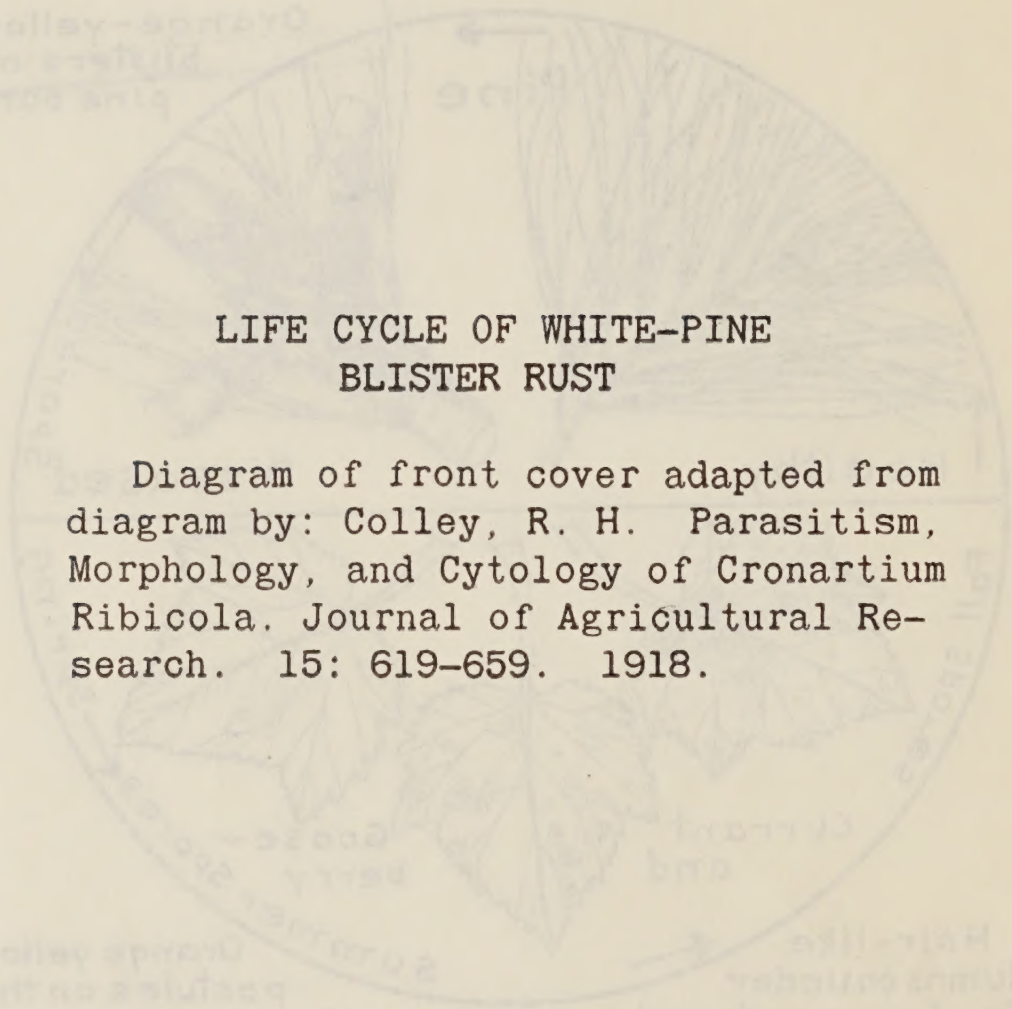
By
Lawrence B. Ritter
Associate Pathologist
July 1, 1936

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

MINNESOTA DEPARTMENT OF FORESTRY
Division of Forests

RECEIVED
JULY 1 1936
U.S. DEPARTMENT OF AGRICULTURE
Orange-yellow
blister on
pine bark

cooperating



LIFE CYCLE OF WHITE-PINE BLISTER RUST

Diagram of front cover adapted from
diagram by: Colley, R. H. Parasitism,
Morphology, and Cytology of *Cronartium*
Ribicola. Journal of Agricultural Re-
search. 15: 619-659. 1918.

WHITE-PINE BLISTER RUST CONTROL

By
Lawrence B. Howe
Associate Entomologist
July 1, 1936

PROTECTION OF MINNESOTA'S WHITE PINE

The 21 million acres of forests in Minnesota are one of the State's greatest resources. They furnish food and shelter for game and fur bearers. They produce wood, which we use in some form every day of our lives. They regulate the flow of streams and conserve the water supply. They add beauty to the country and have an immense recreational value. It is estimated that 2,350,000 tourists visited this State in 1935 and that they spent over \$82,150,000. For these reasons the forest should be wisely used and protected from damage by fire, insects, and disease.

The white pine might well be called our State tree. It was the basis on which was built Minnesota's lumber industry; the source of the initial wealth of the State. Because of its fast growth and utility it is an important forest tree extensively used in reforestation. White pine is one of our most beautiful native trees. In recent years it has been threatened by a serious disease known as white-pine blister rust. This disease is very deceptive, and a tree may be infected for several years before its diseased condition becomes noticeable. Fortunately blister rust can be controlled.

WHITE-PINE BLISTER RUST AND ITS CONTROL

Blister rust is a European disease. It was brought into the United States on young white-pine trees from Europe before there were any laws regulating the entry of plants into this country from foreign sources. The disease was first found near Philadelphia in 1905.

Since the discovery of this disease it has become established in the New England States, New York, New Jersey, Pennsylvania, Maryland, Virginia,

West Virginia, Ohio, Michigan, Wisconsin, Minnesota, Iowa, Montana, Idaho, Washington, Oregon, and California. In Minnesota it was first found near Taylor Falls in 1916. It has spread slowly but surely until it is now present over essentially the entire white pine area of the State.

WHITE-PINE BLISTER RUST IS A PARASITIC FUNGOUS PLANT

A fungus is a plant that does not have green coloring matter. Unlike green plants, it does not make its own food but obtains it from living or dead matter. Blister rust is a parasitic fungus that lives in the bark of white-pine trees and in the leaves of currants and gooseberries.

BLISTER RUST CANNOT SPREAD FROM PINE TO PINE

Blister rust is spread by spores which might be considered very tiny seeds. Spores produced on the infected pine in the spring spread the disease to currants and gooseberries. Spores produced on the leaves of currants and gooseberries during the summer spread the disease to other currants and gooseberries. A third kind of spore produced on the currants and gooseberries late in the summer and early in the fall spreads the disease to white pine, infecting the tree through the needles. The disease cannot spread from pine to pine as only these "fall" spores from currant or gooseberry plants can produce pine infection.

APPEARANCE OF BLISTER RUST ON WHITE PINE

On white pine, blister rust produces bark cankers. These cankers often take the form of spindle-shaped swellings of the bark with a yellowish discoloration around the edges. These discolored swellings are rarely recognized as blister rust by anyone other than a person trained in their identification. In the spring of the third or fourth year

after infection takes place millions of dustlike spores are produced in orange-colored blisters about the size of navy beans on these cankers. These spores are carried by the wind and infect leaves of currants and gooseberries over wide areas.

APPEARANCE OF BLISTER RUST ON CURRANT AND GOOSEBERRY BUSHES

The blister-rust disease attacks currants and gooseberries, both wild and cultivated. In the early summer it appears as orange-colored spots on the underside of the leaves of currant and gooseberry bushes. These spots produce spores that spread the disease to other nearby bushes. Later in the summer these spots are gradually replaced by brown, hairlike outgrowths which produce the spores that spread the disease to pine. Blister rust seldom spreads over 900 feet from currant and gooseberry bushes to white pine. However, the European or, as it is commonly called, the cultivated black currant, may spread the disease to pines a mile or more distant. In Minnesota it is against the law to grow cultivated black currants or to plant any currants or gooseberries in areas where the white pine is an important forest tree.

BLISTER RUST ATTACKS AND KILLS ONLY THE WHITE PINE

White pine can be distinguished from other Minnesota pines (jack and Norway) by its fine needles, 3 or 4 inches long, growing five in a cluster or bundle, and by its cones, which are from 5 to 6 inches long.

The blister-rust fungus enters the white pine through the needles, grows down into, and lives in the bark. The infection may take place on the trunk of the tree or it may grow down a branch into the trunk.

The fungus robs the tree of its food and kills the bark. Thus, when it has completely encircled the trunk the flow of sap is shut off and the tree dies. Small trees are killed much more quickly than the larger ones.

UPROOT CURRANTS AND GOOSEBERRIES TO SAVE THE WHITE PINE

Blister rust can be controlled by uprooting all wild and cultivated currant and gooseberry bushes within 900 feet of white-pine trees. No cultivated black currants should be grown in the white pine region.

Under most conditions, a crew of five or six men working from 6 to 8 feet apart in line, in charge of an experienced foreman, will give good results in removing currant and gooseberry bushes from white-pine stands. Where currant and gooseberry bushes are scarce a smaller crew can be used, the men working farther apart. These men work through the pine area - strip by strip - uprooting and hanging up all currant and gooseberry bushes found, so that they will dry out and die. This work is carried on from the time the leaves appear in the spring until they drop in the fall. After from 3 to 7 years, depending on local conditions, it is advisable to rework the area to destroy any bushes that may have developed from seeds or sprouts. The Division of Forestry of the Minnesota Department of Conservation will furnish free of charge an experienced foreman to aid the men employed by the pine owner in destroying currant and gooseberry bushes in white-pine stands.

WHAT HAS BEEN DONE IN MINNESOTA

The Division of Forestry of the Minnesota Department of Conservation and the United States Department of Agriculture are jointly pursuing a campaign to establish and maintain control of this

disease on all areas containing valuable white-pine growth. Control of the disease has been established on 67,903 acres of white pine in this State.

The European or cultivated black currant is far more susceptible to blister rust than are other currants and gooseberries. This species is usually responsible for the establishment of new infection centers. For this reason it has been destroyed wherever it has been found growing in the northern Minnesota white pine growing area.

FACTS ABOUT THE MINNESOTA BLISTER-RUST LAW

Blister-rust control work in Minnesota is carried on by the Director of the Division of Forestry under the authority of the provision of Chapter 218, Session Laws of 1929. This law gives the Division of Forestry authority to destroy cultivated currants and gooseberries whenever necessary to effect the control of blister rust, and authority to establish blister rust control areas wherein the planting and/or possession of currants and gooseberries may be prohibited.

Currants and gooseberries are not allowed to be planted in the following control areas without a permit.

Whitewater and Lindbergh State Parks and areas within 900 feet thereof: Cook, Lake, Saint Louis, Itasca, Koochiching, Beltrami, Clearwater, Mahnomen, Becker, Hubbard, Cass, Crow Wing, Aitkin, Kanabec, Isanti, Chisago, Pine, and Carlton Counties; that portion of Morrison County lying between the Mississippi River and United States Highway 10, including that portion of the city of Little Falls lying west of the Mississippi River; that portion of Mile Lacs County lying north of State Highway No. 23, Township 32 N., Range 19 W. fourth principal meridian, Wash-

ington County; and limited areas adjoining Newport in Washington County and Lake City in Wabasha County.

Applications for permits to plant currant and gooseberry bushes will not be considered unless the number of plants to be planted and the legal description of the land on which they are to be planted is given. The permits are granted only in case no pine protection work is being carried out in the locality where the currants or gooseberries are to be planted.

If currant and gooseberry plants are ordered to be shipped by mail, freight, or express, this information should accompany your order. Your nurseryman may not ship these plants unless accompanied by a planting permit, and he will, as a matter of routine, refer your order to the Division of Forestry.

Further information regarding blister rust and its control may be obtained from the State leader of blister rust control, Division of Forestry, State Office Building, Saint Paul, Minn.